

ASOS MAINTENANCE NOTE 25 (for Electronics Technicians)

Engineering Division

W/OSO321:BGM/MC

Hygrothermometer Dew Point Sensor Mirror and Optical Loop Adjustment Maintenance.

GENERAL

Maintenance Note 25 makes major changes in the maintenance of the hygrothermometer dew point sensor mirror cleaning and the optical loop adjustment. The changes described in this maintenance note apply to **ALL ASOS** hygrothermometer dew point sensor assemblies ASN S100-2MT4A1A1-1 and S100-2MT4A1A1-2. The changes have been verified by a significant amount of testing and have been approved by the Hygrothermometer Working Group.

The changes are:

1. Two Step Cleaning:

Two step cleaning refers to the current cleaning method without the lacquer thinner step. It originated with the S100-2MT4A1A1-2 (-2 sensor). The -2 sensor has full-board conformal coating. The lacquer thinner can dissolve conformal coating that is adjacent to the mirror and spread it onto the mirror. Subsequent cleaning with alcohol will not remove the conformal coating contaminants from the mirror. The contaminated mirror will have poor performance, including icing.

2. Mirror Waxing:

This maintenance note provides a procedure for the application of wax to the dew point sensor mirror. The waxing of the mirror provides two benefits for the hygrothermometer dew point sensor mirror.

- a. Waxing provides the mirror a surface having a very high surface tension that promotes a dew layer that has an even distribution of very small water droplets. Such a layer prevents large water droplets and "puddles" which ultimately lead to mirror icing.
- b. Waxing provides protection for the mirror surface that will reduce corrosion and its effect on the life of the mirror and the performance of the system.

PROCEDURE

Mirror Cleaning:

The wax that must be used is: **KIT CARNAUBA CAR WAX** manufactured by Northern Labs, Inc. This is a paste type automotive wax with a high proportion of carnauba wax that has no abrasives. The wax is to be procured locally as an expendable item. This wax will not be stocked at the National Logistics Supply Center. Follow the instructions on the container of the wax for storage in a cold climate.

NOTE: In a cold environment this waxing procedure should be done in a warm enclosed area.

- a. The mirror should be waxed every time that it is cleaned and should not be waxed except after cleaning.
- b. Clean the mirror following the instructions in the ASOS Site Technical Manual S100, page 5-40, Table 5.5.2; omit step 10 of this procedure.
- c. Use a clean swab to apply a small amount of wax to the mirror surface. Use a circular motion to ensure that a thin even coat of the wax is applied to the mirror surface. Use care to prevent wax from getting into the optic block holes for the LED and photo transistors.
- d. Allow the wax to dry to a hazy finish.
- e. Use a clean swab to buff the surface to a smooth shiny surface, free of any excess wax.
- f. Use another clean swab to clean up any excess wax around the mirror such as on the edge of the card around the mirror and on the optical block. Confirm that the optic block holes for the LEDs and photo transistors do not have wax blockage.
- g. Continue with the procedure in the Site Technical Manual following the mirror cleaning procedures.

3. Optical Loop Adjustment

This maintenance note revises the optical loop adjustment for all ASOS dew point sensors. Use the attached revised table 5.5.3 and table 5.5.4 for the H083 and 1088 respectively.

The revised procedure adjusts the optical loop using the **SD LEVEL LED** and the **SI LEVEL LED** with a dry mirror. This procedure provides the following advantages over current instructions:

- a. It is easily, quickly, and reliably completed;
- b. It provides a thinner dew layer that reduces the rate of mirror icing; and
- c. It provides more consistent autobalance operation.

EFFECT ON OTHER INSTRUCTIONS

Remove pages 5-47A through 5-47D in the ASOS Site Technical Manual (STM) S100. Replace the removed pages with Appendix A, located in this Maintenance Note.

REPORT MAINTENANCE ACTION

None.

Original Signed

John McNulty
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Attachments:
Appendix A

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Table 5.5.3. Model H083 Temperature/Dewpoint Sensor Optical Loop Adjustment

Step	Procedure
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Tools required:
Small flat-tipped screwdriver
Large flat-tipped screwdriver

CAUTION

The internal components of the aspirator are delicate and must be handled with care. Excessive mechanical shocks can cause permanent damage.

1. Clean the aspirator using the procedure in table 5.5.2. Omit step 10 (lacquer thinner). Do not reapply ac power.
2. Install the sensor/fan assembly in aspirator housing and secure with a captive screw.
3. Using large flat-tipped screwdriver, open the temperature/dewpoint sensor transmitter access door.
4. Reset the autobalance variable resistor to zero.
5. Apply power to the sensor by setting POWER switch to **ON** (up) position.

Table 5.5.3. Model H083 Temperature/Dewpoint Sensor Optical
Loop Adjustment - **Con.**,

Step	Procedure
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NOTE

The adjustments made in this section must be performed on a completely dry mirror. Ensure that the mirror is dry by heating it for a minimum of 1 minute initially, then keeping the mirror temperature above ambient (TA) by using the HEAT position of the TEST switch. The measurements and adjustments described in steps 6 and 7 must not be made while heating the mirror. Therefore, it is necessary to monitor the mirror temperature (TD), via the seven-segment display, and heat as necessary to ensure that TD is greater than TA, making the measurements and adjustments between the heating cycles.

6. Turn **SD GAIN** variable resistor (R21) CCW until **SD LEVEL LED** (CR5) goes **OFF**, then turn CW until **SD LEVEL LED** just goes **ON**.
7. Adjust **SI GAIN** variable resistor (R22) CW until **SI LEVEL LED** (CR9) goes **ON**, then turn CCW until **SI LEVEL LED** just goes **OFF**.
8. Ensure that the **CALIBRATOR** switch is set to **OPR** position.
9. Using large flat-tipped screwdriver, close and secure the temperature/dewpoint sensor transmitter access door.
10. On sensor status page at the OID, turn on report processing for the temperature/dewpoint sensor.

Table 5.5.4. Model 1088 Temperature/Dewpoint Sensor Optical Loop Adjustment

Step	Procedure
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Tools required:
Small flat-tipped screwdriver
Large flat-tipped screwdriver

CAUTION

Internal components of the aspirator are delicate and must be handled with care. Excessive mechanical shocks can cause permanent damage.

1. Clean the aspirator using the procedure in table 5.5.2. Omit step 10 (Lacquer thinner) Do not reapply ac power.
2. Install the sensor/fan assembly in aspirator housing and secure with a captive screw.
3. Using large flat-tipped screwdriver, open the temperature/dewpoint sensor transmitter access door.
4. Reset the autobalance variable resistor to zero.
5. Apply power to the sensor by setting the POWER switch to **ON** (up) position.

Table 5.5.4. Model 1088 Temperature/Dewpoint Sensor Optical
Loop Adjustment - **Con.**,

Step	Procedure
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NOTE

The adjustments made in this section must be performed on a completely **dry** mirror. Ensure that the mirror is dry by heating it for a minimum of 1 minute initially, then keeping the mirror temperature above ambient (TA) by using the HEAT position of the MODE switch. The measurements and adjustments described in steps 6 and 7 must not be made while heating the mirror. Therefore, it is necessary to monitor the mirror temperature (TD), via the seven-segment display, and heat as necessary to ensure that TD is greater than TA, making the measurements and adjustments between the heating cycles.

6. Turn **SD GAIN** variable resistor (R21) CCW until **SD LEVEL LED** (CR5) goes **OFF**, then turn CW until **SD LEVEL LED** just goes ON..
7. Adjust **SI GAIN** variable resistor (R22) until **SI LEVEL LED** (CR9) goes on, then back off **SI GAIN** until **SI LEVEL LED** just goes off.
8. Ensure that the **MODE** switch is set to **OPR** position.
9. Using the large, flat-tipped screwdriver, close and secure the temperature/dewpoint sensor transmitter access door.
10. On the sensor status page at the OID, turn on report processing for the temperature/dewpoint sensor.